

WELSH & KATZ, LTD.*Attorneys at Law*

120 SOUTH RIVERSIDE PLAZA - 22ND FLOOR

CHICAGO, ILLINOIS 60606

TELEPHONE (312) 655-1500

FACSIMILE (312) 655-1501

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TO:

Don Storm- Examiner

Firm:

United States Patent and Trademark OfficeArlington, VA. 22313

Fax #:

703-746-5831

Tel #:

FROM:

Walter J. Kawula, Jr.

Fax #:

(312) 655-1501

Tel #:

(312) 655-1500

RE:

Informal Amendment for discussion

File #:

7416/78600

Please see the following attached informal Amendment.

Walter J. Kawula, Jr., Esq.

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Informal Amendment for Discussion Purposes.

Application No. 09/697,276 (our docket 7416/78600)

As we discussed by telephone, attached are amendments in written form for the purpose of discussion in the above-referenced application. In the Specification, after the sentence beginning with "Figure 8 depicts . . ." (page 8), please add the following sentence:

Figure 9 depicts a flow chart of a method to design an inverse filter according to the invention.

Also, prior to the paragraphs numbered 1-7 (page 18), please amend the sentence as follows:

The illustrated inverse filter may be designed using several methods, the following steps illustrated in Fig. 9 describe one method to design the inverse filter.

In the claims, please amend the claims as follows. The claims are amended for purposes of clarity, and not to overcome any prior art. In claim 1, change "pre-filter" to "inverse filter."

1. (Currently Amended) A method of signal processing signals having transmission path characteristics, comprising the steps of:
inverse filtering an input signal having transmission path characteristics before processing the input signal wherein the transmission path characteristics of the input signal are reduced; and

processing the input signal;

wherein an inverse filter is used to filter the input signal and an encoder is used to process the input signal, the inverse filter being in communication with the encoder;

the inverse filter having an inverse amplitude response of a filter described by $h(t)$, the filter approximating noisy ambient conditions including telephone-channel-bandwidth conditions and the ~~pre-filter~~ inverse filter response being characterized by:

$G(\omega) \approx \frac{1}{|H(\omega)|}$ wherein $H(\omega)$ is the frequency response of $h(t)$ and $G(\omega)$ is the inverse

filter frequency response.

In claim 10, add language further defining the summation of coefficients a_1, \dots, a_p as follows:

10. (Currently Amended) The method of claim 9 wherein $|G(\omega)|^2$ is characterized by the equation

$$|G(\omega)|^2 = \frac{1}{|1 + \sum_{k=1}^p a_k e^{-j\omega k}|^2}$$

wherein a_k are the p obtained coefficients a_1, \dots, a_p .

In claim 13, replace the upper limit "K" with the upper limit "M-1" as follows:

13. (Currently Amended) The method of claim 8 wherein the inverse Fast Fourier Transform (IFFT) of $P(k)$ is characterized by:

$$\text{IFFT}(P(k)) = R(m) = \sum_{k=0}^{M-1} \frac{1}{|H(k)|^2} * e^{\frac{j2\pi km}{M-1}}$$

In claim 16, change "pre-filter" to "inverse filter."

16. (Currently Amended) The method of claim 15 wherein the using the moving average model average model parameters to design the inverse filter comprises the sub-steps of:

applying the parameters to the equation:

$$|G(\omega)|^2 = \frac{1}{|1 + \sum_{k=1}^p a_k e^{-j\omega k}|^2} = \frac{1}{|H(\omega)|^2}$$

wherein $G(\omega)$ is the frequency response of the ~~pre-filter~~ inverse filter and a_k are the model parameters; and

using $G(\omega)$ to design the inverse filter.

In claim 24, add k to define the number of harmonics:

24. (Currently Amended) The method of claim 17, wherein the obtained data further includes spectral amplitude information; and wherein the preprocessing the received encoded data step further includes the sub-steps of:

adjusting a number k of harmonics for a spectrum of a frame having a new pitch parameter.

In claim 30, change "the signal" to "the signal data" to conform with the earlier recitation of the same term.

30. (Currently Amended) A speech system comprising:

an inverse filtering means for inverse filtering signal data having transmission path characteristics;

an encoder, the encoder including parameterizing means for parameterizing the signal data and encoding means for encoding the signal data, the encoder being in communication with the inverse filtering means;

a parameter preprocessor, the parameter preprocessor including receiving means for receiving the encoded signal data and preprocessing means for preprocessing the received encoded signal data, the preprocessing means including:

means for obtaining signal data from the received encoded data, wherein the obtained data includes pitch parameter data for a trajectory of successive frames of the signal data;

means for removing at least one pitch parameter departure from the trajectory of successive frames;

means for smoothing the trajectory;

means for calculating at least one multiple corresponding to an obtained pitch parameter of a frame having a pitch parameter departure and at least one sub-multiple corresponding to the obtained pitch parameter;

means for comparing a pitch parameter from the removed and smoothened trajectory that corresponds to the obtained pitch parameter with the at least one corresponding multiple and the at least one corresponding sub-multiple; and

means for replacing the obtained pitch parameter with a new pitch parameter based on the comparison, the new pitch parameter being selected from the at least one corresponding multiple and the at least one corresponding sub-multiple the parameter preprocessor being in communication with the encoder;

a decoder, the decoder including decoding means for decoding the preprocessed signal data and synthesizing means for synthesizing the preprocessed signal data into a speech signal, the decoder being in communication with the parameter preprocessor.

Respectfully submitted,

Walter Kawula

Welsh & Katz, Ltd.

Reg. No. 39724.